

VALUING THE IMPACT OF SYNERGIES ON PUBLIC MERGERS/ACQUISITIONS IN THE PHARMACEUTICAL SECTOR ON THE EUROPEAN CAPITAL MARKETS

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Abstract: : Valuing and identifying synergies in mergers and acquisitions is one of the important issues in Corporate Finance. The aim of this paper is to value the impact of synergies resulted from mergers/acquisitions in the European pharmaceutical sector, realized between 2004 and 2007. In the study it has been analyzed the impact of the announcement of the deal on the stock price evolution of the acquiring companies for which it was used the event study technique. The results show clearly the positive market expectations in the day of the announcement as well as 6 days after, however the expected positive impact begins to fade out resulting in negative expectations in days 23 and 38, while regaining its confidence in day 39.

JEL classification: C12, G15, G34

Key words: mergers, acquisitions, synergies, valuation, public offers

1. INTRODUCTION

One important point of interest has always been represented by the reasons why mergers occur. The economic theory has provided several possible reasons among which attempts to create market power, better corporate governance, opportunities of diversification, efficiency related reasons which often involve economy of scales or other types of synergies.

Most of the researches tried to come out with theories in order to explain the mergers and acquisitions over the last decades, and the drivers of these mergers and acquisitions. The studies have been performed in function of the analyzed period and several main reasons have been identified: regulatory changes such as antitrust legislations or later on deregulation of the markets; industrial and technological shocks, or even managerial behavior etc.

There is one aspect which remains as a central reason for all mergers/acquisitions and that is the expected combined effect of the two companies involved in the acquisition process which should result into a new entity which should provide synergistic gain and should match market expectations.

Finance literature gives an important role to synergies being also considered as a sensible subject. There are several authors who have made important research studies on the synergistic expectations and tried to value the impact of these synergies. Among them we have as a promoter back in 1959 Penrose who saw in the synergistic hypothesis the growth basis for a company fundamentals. The subject was further developed by Sirower (1997) who saw synergies as an increase in competitiveness; Bhidé (1993) for whom the operating synergy was the primary motive in mergers and acquisitions based on a study of 77 acquisitions, the results being positive for a third of these companies.

A more recent approach is that of Aswath Damodaran (2005) who tried to establish through an empirical study how much value do synergies produce and the price

for these synergies. His conclusion is not as encouraging as its predecessors, because although synergies are expected, only in a few cases they are delivered, or they can cover the price paid for the acquired company.

2. OBJECTIVES

Reviewing the evidence, it is clear that markets think that there is potential for synergy at the time of mergers and acquisitions but it is also obvious that only a small proportion of mergers deliver considerable synergy. In this paper I study the markets reaction and expectation of the synergistic gain. Empirical researches on mergers and acquisitions over the last century have proven that in many cases the effect of these operations is that of additional value and wealth increase for both target and acquiring company. This research paper is trying to evaluate if after a merger/acquisition announcement there are positive expectations of synergistic gain for the acquiring company and I look to provide additional evidence to support this, by an up-dated study based on a recent sample of public deals between 2004 and 2007. These deals are all public and all acquiring companies are listed on European stock exchanges part of EU.

3. METHODOLOGY

In this paper are analyzed the market reactions to the acquisition announcement and in order to achieve our purpose we used the event study technique to analyze the effect of acquisitions and merger announcements of companies in the pharmaceutical sectors listed on the European capital markets.

The study is based on a sample of 45 successful tender offers occurring over the period 2004-2007. The primary data base consisted of 137 public operations (available on www.mergermarket.com), all of them being European pharmaceutical companies acquisitions/mergers within the before mentioned period. I have to underline that the hostile takeovers have been excluded from the initial data. The final sample was reduced to only 45 companies due to the fact that in many cases although the offer was public, it involved the acquiring company being listed and delisted afterwards, thus being difficult to conclude with the research. In other cases I noted several multiple successive acquisitions which made impossible a clear differentiation of one particular acquisition synergistic impact. The historical data was no longer available for some of the companies within the initial sample because meanwhile they have become a target for someone else, and these companies have been excluded. Also all companies which were subsidiaries of other non-European companies (eg: several Indian companies have been active on the European pharma market during that period) have been excluded from the final sample.

The main markets where these companies were traded are London Stock Exchange, Deutsche Borse AG, Nordic Stock Exchange, Borsa Italiana, Vienner Borse and as a exception for one UK based company, namely Astra Zeneca have been used data from New York Stock Exchange.

Another important part of the sample is represented by the market index, which implied a correlation between each company and a significant index (I have tried to identify for all companies the index they were part of) Please see in Appendix 1 an attached table with all the companies. For each announcement, there have been determined the exact issuing date. In all cases, the date of the event, which appears as the announcement date in Appendix 1, was considered the date of approval. The abnormal return was daily measured during the window event, $(T_1 + 1, T_2]$, which is composed of twenty days before the event, the date of the event, and 60 days after the event. Abnormal

return has been determined as the difference between the actual return and the normal return. To calculate the normal return it is used the market model, a model which relates the return of any given stock with the return of the market portfolio. For any security i the market model is:

$$R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_{it}$$

$$E(\varepsilon_{it}) = 0 \quad \text{var}(\varepsilon_{it}) = \sigma^2_{\varepsilon_i}$$

where R_{it} and R_{mt} are the returns of the t period on the security i and the market portfolio while ε_{it} is the zero mean disturbance term. α_i , β_i and $\sigma^2_{\varepsilon_i}$ are the market model parameters. The benefits resulting from the use of market model will depend on the R^2 of the market model regression. Unfortunately the regression models made in this study for some of the companies had levels of the before mentioned coefficient quite low, however acceptable. We have noted an improvement of the regressions once the right index was identified and thus the stock price correlated with the market evolution.

The used estimation period, $(T_0, T_1]$, where t got values for determining the parameters of the model market, is made up of 230 working days before the event window. In the analysis done I took as approximation for the market portfolio several index (as mentioned before) correlated with each company: e.g. Bel 20, FTSE, FTAS, FTSEMIB, DAX, MDAX, ATX, Euronext 100, Index Next 150, Cac Mid 100. The used prices of shares were the ones at closing.

By eliminating that part of the return which is due to the variation of the market return, the variance of the abnormal return is reduced; this causes an increased ability to detect the effects of events.

If \overline{AR}_{it} , $t = T_1 + 1, \dots, T_2$, is the sample of L_2 abnormal returns for the company i in the window event, then:

$$\overline{AR}_{it} = R_{it} - \alpha_i - \beta_i \times R_{mt}$$

The abnormal return is the disturbance term of the market model calculated on an out of the sample basis. Under the null hypothesis H_0 the distribution of the sample abnormal return for a given observation in the event window is:

$$\overline{AR}_{it} \sim N(0, \sigma^2(\overline{AR}_{it}))$$

To determine if the announcement had an impact at the level of every day of the event window, we conducted the t-test that has supposed the calculation of θ_1 statistics according to the formula:

$$\theta_1 = \frac{\bar{x} - 0}{s / \sqrt{n}}$$

where:

s = sample standard error of abnormal return during the analyzed day

n = number of announcements in the sample

4. ANALYSES

The t test completion with all the 45 announcements included in the studied sample for each of the 81 days of the event window, led to the determination of 6 days (1 day before the event and the rest after that date) where the null hypothesis H_0 stating that the information had no impact is strongly rejected. Adjusting the price of shares to reflect the new public information on mergers and acquisitions is carried out and as expected has a positive impact in the day of the announcement and continues to have a positive behavior 6 days latter implying still a synergistic expectation from the market. If the positive impact in the announcement day can be argued by some as being also influenced by the control premiums the evolution in day 6 can be only the result of expected synergies. Although the

markets expectations seem to drop in days 23 and 38, we can see that the final impact is a positive one as the market still expects a positive outcome.

Table no. 1. Statistics θ_1 in the days that the information had an impact

Event Day	$\theta_1(n=45)$	Event Day	$\theta_1(n=45)$
-4	2.26	23	-2.05
0	2.03	38	-2.22
6	2.02	39	2.29

Note: the level of significance is 5%.

This study confirms the results of previous empirical research on the expected of the expected synergies in the short term. However it becomes very difficult to demonstrate this on the longer term.

5. CONCLUSIONS

Due to an unprecedented wave of mergers and acquisitions which has transformed the entire industry (including the pharmaceutical subsector) plus value has been created, however there are also a relatively large number of failures which show that the theory is not always applicable in practice. Moreover almost everyone associates the concept of synergy with the theory of efficiency, which supports the creation of value through mergers/acquisitions.

The study showed that on a short period of time can be identified positive market reactions to the announced mergers and acquisitions based on the expected synergistic impact. Many argue that it is difficult to identify the sources of positive gain in mergers and acquisitions, but after reviewing the results, it is clear that markets think that there is potential gain for synergy at the time of mergers. The expectations are not always positively correlated with the actual resulted synergy from mergers/acquisitions and positive or negative synergy can exist, the condition being that when the company's parts interact to produce a joint effect it should be greater than the sum of the parts acting alone.

This study shows a similar behavior of markets for the selected sample and as a next step it will be enlarged including also the crisis period in order to see if the crisis has inflicted a different behavior to the markets expectations for synergy. A second direction would be to analyze the behavior and synergistic expectations for Romanian companies involved in a merger/acquisition process.

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APPENDIX 1

MEUR

	Country	Date of announcement	Symbol	Purchaser	Target	Value	Type of acquisition
1	Deutschland	12/20/2004	CLS1	Celesio AG	Healthcare Logistics LTD	82	Acquisition, Cross border, Private
2	Deutschland	12/22/2004	SAZ.F	Stada Arzneimittel AG	Nizhpharm JSC	81	Acquisition, Cross border, Private
3	Italy	1/17/2005	REC.MI	Recordati Spa Biocompatibles	Merckle GmbH	45	Acquisition, Cross border, Private
4	UK	3/4/2005	BII	International PLC	CellMed AG	10	Acquisition, Cross border, Private
5	France	3/4/2005	BOI.PA	Boiron SA	Dolisos Evotec Neurosciences	10	Acquisition, Domestic, Private
6	Deutschland	3/6/2005	EVTA.F	Evotec AG	GMBH	37	Acquisition, Domestic, Private
7	Deutschland	4/11/2005	SAZ.F	Stada Arzneimittel AG	Cicum farma	31	Acquisition, Cross border, Private
8	Sweden	6/27/2005	BIOP	BioPaushia AB	Cross Pharma Group AB Ionix Pharmaceuticals	4	Acquisition, Domestic, Public
9	UK	7/6/2005	VER	Vernalis PLC	Limited	18	Acquisition, Domestic, Private
10	Belgium	7/12/2005	SVYSY	Solvay SA	Fournier Pharma	1200	Acquisition, Cross border, Private
11	Sweden	8/8/2005	MDABF.PK	Meda AB	Meda Pharma GMBH	750	Acquisition, Cross border, Private
12	Sweden	8/22/2005	BVT	Biovitrum AB Merck Genericos (subsidiara companiei germane)	Arexis AB	13	Acquisition, Cross border, Private
13	Spain	9/14/2005	MRK.F		Prasfarma SA	20	Acquisition, Cross border, Private
14	Czech Republic	9/15/2005	UWW.SG	Zentiva NV	Venoma Holdings Limited	83	Acquisition, Cross border, Public
15	Belgium	9/21/2005	GLPG.BR	Galapagos NV Lloydspharmacy Limited (Celesio AG)	BioFocus DPI 111 Cohens and Scholes Pharmacies	28	Acquisition, Cross border, Public
16	Deutschland	10/14/2005	CLS1		Survac ApS	146	Acquisition, Cross border, Private
17	Deutschland	11/18/2005	MRK.F	Merck KGaA	Kudos Pharmaceuticals limited	11	Acquisition, Cross border, Private
18	UK	12/23/2005	AZN	Astra Zeneca PLC	Groupe CS Dermatologie SAS	177	Acquisition, Cross border, Private
19	UK	3/13/2006	SPH.L	Sinclair Pharma PLC	Bayer Schering Pharma AG	53	Acquisition, Cross border, Private
20	Deutschland	3/24/2006	Baya.F	Bayer AG	Zentiva NV	15637	Acquisition, Domestic, Public
21	France	3/27/2006	SAN.PA	Sanofi Aventis	Cambridge Antibody Technology Group Plc Discovery Partners	430	Acquisition, Cross border, Private
22	UK	5/15/2006	AZN	Astra Zeneca PLC	International	810	Acquisition, Domestic, Public
23	Belgium	6/13/2006	GLPG.BR	Galapagos NV	Jaba Pharmaceutica	4	Acquisition, Cross border, Private
24	Italy	7/28/2006	REC.MI	Recordati Spa	Carlsson Research AB	45	Acquisition, Cross border, Private
25	Denmark	8/23/2006	NeuroSearch	NeuroSearch AS	Avidex Limited	27	Acquisition, Cross border, Private
26	Deutschland	8/30/2006	MDG.F	Medigene AG	Bayer Schering Pharma AG	48	Acquisition, Domestic, Private
27	Deutschland	11/8/2006	Baya.F	Bayer AG	3M Company	1112	Acquisition, Cross border, Public
28	Sweden	11/9/2006	MDABF.PK	Meda AB	Innovata Plc	668	Acquisition, Cross border, Public
29	UK	11/17/2006	Vec.L	Vectura Group	Domantis	161	Acquisition, Cross border, Private
30	UK	12/8/2006	GLAXO.NS	GSK	Genmab A/S	347	Acquisition, Cross border, Public
31	UK	12/19/2006	GLAXO.NS	GSK	Armedica Trading (Gedeon Richter)	273	Acquisition, Cross border, Public
32	Hungary	12/19/2006	RIG1.F		Dita Group	15	Acquisition, Cross border, Private
33	Austria	1/15/2007	IJE.F	Intercell AG	Pelias Biomedizinische	6	Acquisition, Domestic, Private
34	UK	1/22/2007	HIK	Hikma Pharmaceuticals	Ribosepharm GmbH	35	Acquisition, Cross border, Private
35	UK	1/24/2007	NUT.L	NeutraHealth	Brunel Healthcare Limited	10	Acquisition, Domestic, Private
36	UK	2/1/2007	AZN	Astra Zeneca PLC	Arrow Therapeutics	115	Acquisition, Domestic, Private
37	France	3/1/2007	BCGL	BTG Industries et Sante	Vita Pharma AS Oxon Therapeutics Limited	25	Acquisition, Cross border, Private
38	UK	3/12/2007	Oxb	Oxford Biomedica	Apoxis SA Unicus Regulatory Services limited	19	Acquisition, Cross border, Private
39	Denmark	4/11/2007	Topo	Topo Target AS	Strathmann Biotec	15	Acquisition, Cross border, Private
40	UK	4/12/2007	FULL	Fulcrum Pharma Plc	Forum Biosciences Holdings Ltd	7	Acquisition, Domestic, Private
41	Hungary	8/6/2007	RIG1.F	Gedeon Richter	Orphan Europe	23	Acquisition, Cross border, Private
42	Deutschland	8/31/2007	SAZ.F	Stada Arzneimittel AG	Biolipox AB	47	Acquisition, Cross border, Private
43	Italy	9/28/2007	REC.MI	Recordati Spa	Recip AB	135	Acquisition, Cross border, Private
44	Sweden	10/15/2007	ORX.ST	Orexo AB	VetXX A/S	77	Acquisition, Cross border, Public
45	Sweden	10/25/2007	MDABF.PK	Meda AB		343	Acquisition, Domestic, Public
46	UK	12/12/2007	DPH.L	Dechra		86	Acquisition, Cross border, Public

APPENDIX 2

Day	Rentability	Cumulated Rentability	AR	CAR	Standard error	θ_1
60	0.06%	3.82%	0.71%	-1.52%	0.0047	1.5222
59	0.16%	3.77%	-0.34%	-2.24%	0.0055	-0.6246
58	-0.12%	3.60%	-0.42%	-1.89%	0.0044	-0.9555
57	0.12%	3.73%	0.00%	-1.47%	0.0037	-0.0008
56	-0.11%	3.61%	0.25%	-1.47%	0.0039	0.6463
55	0.06%	3.72%	-0.02%	-1.73%	0.0032	-0.0596
54	0.05%	3.66%	-0.35%	-1.71%	0.0045	-0.7755
53	0.00%	3.61%	-0.28%	-1.36%	0.0031	-0.9018
52	0.05%	3.61%	0.13%	-1.08%	0.0025	0.5029
51	-0.02%	3.56%	-0.33%	-1.20%	0.0031	-1.0516
50	-0.07%	3.58%	0.73%	-0.88%	0.0039	1.9009
49	0.08%	3.65%	-0.32%	-1.61%	0.0048	-0.6552
48	0.20%	3.56%	0.11%	-1.29%	0.0043	0.2509
47	-0.18%	3.37%	0.29%	-1.40%	0.0057	0.5112
46	-0.21%	3.55%	-0.10%	-1.69%	0.0042	-0.2508
45	0.29%	3.76%	-0.24%	-1.59%	0.0038	-0.6362
44	0.27%	3.46%	0.21%	-1.34%	0.0026	0.8051
43	0.07%	3.20%	0.37%	-1.55%	0.0035	1.0776
42	-0.11%	3.12%	-0.61%	-1.93%	0.0035	-1.7269
41	0.14%	3.24%	0.16%	-1.32%	0.0028	0.5854
40	-0.16%	3.10%	-0.05%	-1.48%	0.0029	-0.1688
39	0.27%	3.26%	0.76%	-1.43%	0.0033	2.2924
38	-0.08%	2.99%	-0.77%	-2.19%	0.0035	-2.2210
37	0.10%	3.07%	-0.11%	-1.41%	0.0030	-0.3752
36	0.10%	2.97%	0.07%	-1.30%	0.0028	0.2397
35	0.04%	2.87%	-0.70%	-1.37%	0.0037	-1.8954
34	-0.09%	2.82%	0.11%	-0.67%	0.0027	0.4025
33	0.11%	2.92%	-0.39%	-0.78%	0.0031	-1.2667
32	0.25%	2.80%	0.43%	-0.39%	0.0037	1.1464
31	-0.24%	2.56%	-0.10%	-0.81%	0.0033	-0.3185
30	0.10%	2.80%	0.63%	-0.71%	0.0037	1.7082
29	0.07%	2.70%	-0.06%	-1.34%	0.0034	-0.1772
28	0.18%	2.63%	-0.08%	-1.28%	0.0032	-0.2576
27	0.06%	2.45%	-0.72%	-1.19%	0.0044	-1.6252
26	0.01%	2.39%	0.03%	-0.48%	0.0039	0.0782
25	0.00%	2.38%	0.06%	-0.51%	0.0029	0.2116
24	-0.16%	2.37%	0.45%	-0.57%	0.0037	1.2055
23	0.05%	2.54%	-0.81%	-1.01%	0.0039	-2.0489
22	0.25%	2.49%	-0.25%	-0.21%	0.0044	-0.5623
21	-0.11%	2.24%	-0.27%	0.04%	0.0033	-0.8084
20	-0.11%	2.34%	0.27%	0.31%	0.0028	0.9981
19	0.10%	2.45%	-0.36%	0.04%	0.0032	-1.1260
18	-0.01%	2.35%	0.46%	0.40%	0.0032	1.4354
17	-0.12%	2.37%	-0.39%	-0.06%	0.0044	-0.8744
16	0.04%	2.48%	0.02%	0.32%	0.0034	0.0727
15	0.09%	2.44%	0.09%	0.30%	0.0029	0.2913
14	0.05%	2.35%	0.12%	0.21%	0.0036	0.3431
13	0.13%	2.30%	-0.54%	0.09%	0.0028	-1.9180
12	0.06%	2.17%	-0.23%	0.63%	0.0031	-0.7360
11	-0.03%	2.11%	-0.23%	0.86%	0.0028	-0.8323
10	0.14%	2.14%	-0.28%	1.09%	0.0039	-0.7151
9	-0.15%	2.00%	0.05%	1.37%	0.0023	0.1948
8	-0.02%	2.15%	-0.37%	1.32%	0.0029	-1.2815
7	0.23%	2.17%	0.22%	1.69%	0.0033	0.6571
6	-0.05%	1.93%	0.78%	1.48%	0.0038	2.0210
5	0.00%	1.98%	-0.47%	0.70%	0.0027	-1.7496
4	0.02%	1.98%	-0.40%	1.17%	0.0024	-1.6885
3	-0.08%	1.96%	0.18%	1.58%	0.0030	0.5982
2	0.16%	2.04%	-0.08%	1.40%	0.0047	-0.1604
1	0.12%	1.88%	0.59%	1.47%	0.0064	0.9290
0	-0.10%	1.76%	1.68%	0.88%	0.0082	2.0360
-1	0.06%	1.86%	-0.49%	-0.80%	0.0035	-1.4043
-2	0.28%	1.80%	0.03%	-0.30%	0.0026	0.1031
-3	-0.01%	1.51%	0.61%	-0.33%	0.0039	1.5581
-4	0.02%	1.53%	0.80%	-0.94%	0.0035	2.2667
-5	0.14%	1.50%	0.44%	-1.74%	0.0043	1.0191
-6	0.11%	1.36%	-0.38%	-2.18%	0.0029	-1.3313
-7	0.05%	1.25%	-0.34%	-1.79%	0.0023	-1.4876
-8	0.05%	1.20%	-0.26%	-1.45%	0.0026	-1.0211
-9	0.14%	1.15%	-0.29%	-1.19%	0.0025	-1.1602
-10	0.18%	1.02%	0.16%	-0.89%	0.0020	0.8034
-11	0.05%	0.84%	0.10%	-1.05%	0.0028	0.3504
-12	0.18%	0.79%	-0.10%	-1.15%	0.0023	-0.4153
-13	0.01%	0.60%	-0.10%	-1.06%	0.0025	-0.4210
-14	0.34%	0.60%	-0.07%	-0.95%	0.0039	-0.1844
-15	0.09%	0.26%	-0.22%	-0.88%	0.0025	-0.8688
-16	-0.13%	0.17%	-0.43%	-0.66%	0.0025	-1.7087
-17	-0.04%	0.30%	0.09%	-0.23%	0.0035	0.2716
-18	0.14%	0.34%	-0.18%	-0.33%	0.0036	-0.5043
-19	-0.11%	0.20%	-0.34%	-0.15%	0.0025	-1.3614
-20	0.32%	0.32%	0.19%	0.19%	0.0030	0.6365